FUSE System Software User Guide

Nallatech is the leading FPGA-Centric Systems provider, with unrivalled industry expertise in the provision of complete systems including hardware, IP and software.

Nallatech's industry-leading products and services are used in many application areas, including DSP & Imaging, Telecommunications & RF, Aerospace & Defence, and Networking & Storage. Nallatech offers design services for complete systems, in addition to the modular DIME™ and DIME-II™ product ranges for electronic systems.
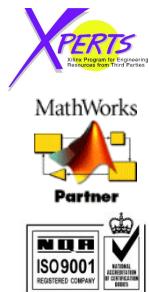
Contacting Nallatech:

Support:

WWW:
Go to www.nallatech.com and click 'support'

Email:
support@nallatech.com

Headquarters

Europe & Asia-Pacific:	*North America:*
Nallatech	Nallatech Inc
Boolean House	12565 Research Parkway
One Napier Park	Suite 300
Cumbernauld	Orlando
Glasgow G68 0BH	Florida 32826
United Kingdom	United States of America

Phone/Fax

Europe & Asia-Pacific:
Phone: +44 (0)1236 789500
Fax: +44 (0)1236 789599

North America:
Phone: +1 407 384 9255
Fax: +1 407 384 8555

Email:

sales@nallatech.com

WWW:

www.nallatech.com

Document Name: FUSE System Software User Guide

Document Number: NT107-0068V2

Issue Number: 3

Date of Issue: 09-05-2002

Trademark Information:

The Nallatech logo, the DIME logo, the DIME-II logo, FUSE, Field Upgradeable Systems Environment, DIME, DIME-II, FUSE System Software and the "Bally", "Ben" and "Strath" product name prefixes are all Trademarks of Nallatech Limited. "The Algorithms to Hardware Company", "Making Hardware Soft", "FPGA-Centric Systems", "the only logical solution" and "software defined systems" are Service Marks of Nallatech Limited.

All products or brand names mentioned herein are used for identification purposes only and are trademarks, registered trademarks, or service marks of their respective owners.

Copyright Information:

Contents

REFERENCE GUIDE 41

List of Figures

Part I

Introduction

This User Guide provides detailed instructions on how to use Nallatech's FUSE System Software.

This part of the User Guide provides an overview of the FUSE System Software. In the following Sections:

- Section 1: Preface
- Section 2: Overview

Section 1

Preface

In this Section:

- About this User Guide

- Abbreviations

1.1 About this User Guide

This User Guide provides detailed information on the FUSE System Software GUI. The main focus of the User Guide is to provide information that allows the user to become acquainted with the GUI and the functionality it provides.

Throughout this document there are symbols to draw attention to important information:

The blue 'i' symbol indicates useful or important information.

The red '!' symbol indicates a warning, which requires special attention.

1.2 Abbreviations

- **API:** Application Programming Interface

- **CD:** Compact Disk

- **DIME:** DSP and Image processing Modules for Enhanced FPGAs

- **DSP:** Digital Signal Processing

- **FPGA:** Field Programmable Gate Array

- **FUSE:** Field Upgradeable Systems Environment

- **GUI:** Graphical User Interface

- **TCP/IP** Transmission Control Protocol/Internet Protocol

Section 2

Product Overview

In this Section:

- FUSE System Software description

2.1　　FUSE System Software description

The FUSE System Software GUI is a high-level user interface for interfacing with Nallatech DIME and DIME-II motherboard cards and modules. FUSE System Software is a Java-based application that allows the user to easily interface with multiple cards, configure FPGAs, and apply2 DMA transfers. The application also allows the user to control the cards through Nallatech's scripting language - DIMEScript. An introduction to DIMEScript and its main features is provided in Part 3- Implementation Guide of this User Guide.

The FUSE System Software uses the Java FUSE API to interface with the cards. A C/C++ version of this API is provided on the FUSE System Software CD. This gives the user the ability to develop a more specific application for their designs. The Java FUSE API is not provided, although it can be purchased separately. Similarly, a FUSE API for Matlab is also available. For more information on the FUSE API see the C/C++ API developers guide on the FUSE System Software CD.

Part 2

Installation Guide

This part of the User Guide contains information on installing the Fuse System Software. In the following Sections:

- Section 3: Software Installation

Section 3

Software Installation

In this Section:

- Software Requirements

- Software Installation Guide – Windows

- Software Installation Guide – Linux

- TCP/IP Server Installation

3.1 Software Requirements

The FUSE API runs under the following operating systems:

- Microsoft Windows XP Professional

- Microsoft Windows 2000

- Microsoft Windows Millennium Edition

- Microsoft Windows NT Service Pack 4

- Microsoft Windows 98

3.2 Software Installation Guide – Windows

The Windows 95/98/NT/2000/ME/XP Installation is detailed below.

1. ↗ When the supplied CD is inserted it will auto-run. If the CD does not auto-run, run the following program: *CD_Drive:\ autorun.exe*. When the program runs, the following screen will appear:
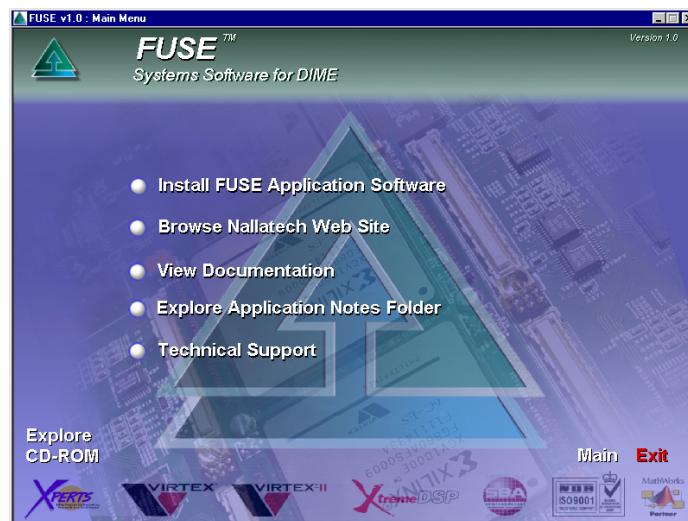
Figure 1: CD Installation Screen shot

2. 🖱 Click the option 'Install FUSE Application Software'.

3. The installation process begins. It uses a standard installation interface, with which most users will be familiar. Work through the dialog boxes, filling in details as required until the 'Finish' dialog box is reached.

4. 🖱 Click 'Finish' to install the software.

5. The PC then needs restarted to complete the installation.

Initial Confidence Test

As an initial confidence test, in the Windows task bar run the FUSE.exe:

Start -> Programs -> FUSE -> Software ->

When the software and drivers have been installed correctly and the hardware is present in the PC, a screen similar to that below will appear: To test if FUSE has been correctly installed, try to open the card. For more information on opening cards, see How to open a card on page 17.
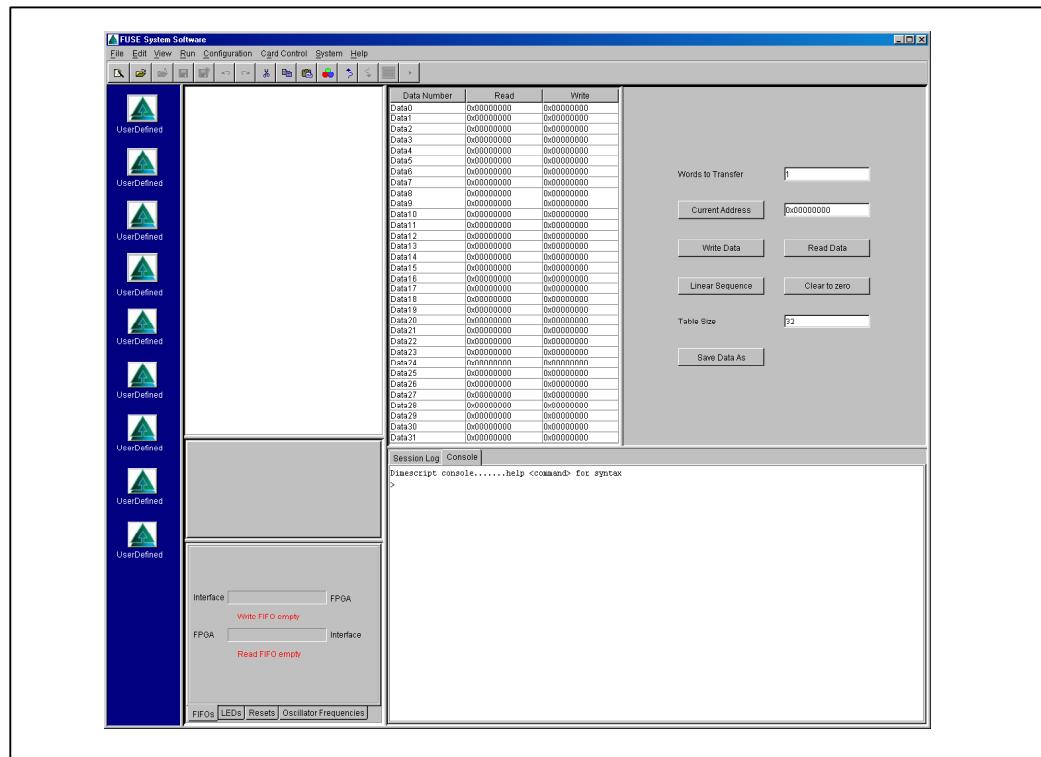
Figure 2: User Interface

Uninstalling application software

☝ To uninstall the FUSE software from your system, select the 'Uninstall FUSE software' option from the FUSE Software Section, within 'Programs' of the Windows 'Start Menu'.

3.3   Software Installation Guide – Linux

On the Fuse CD there are 2 tgz files. The first, FuseLinux2.4, contains all of the drivers and examples. The second tgz file is FuseUserInterface.tgz, which contains all of the files for the user interface. The Linux installation for kernel version 2.4 is detailed below.

This installation has been tested on Redhat Standard installation 6.2, 7.0 and 7.1 and Suse Linux installation 7.3.

1.   Insert the installation CD

2.   Mount the installation CD

> mount -t iso9660 /dev/cdrom /mnt/cdrom

3.   Go to the area where you wish to install the software. For example:

> cd /usr/local/nallatech

4.   Unzip the files of the FuseLinux2.4.tgz

> tar -xvzf /mnt/cdrom/FuseLinux2.4.tgz

5. Unzip the files of the FuseUserInterface.tgz file.

>tar –xvzf /mnt/cdrom/FuseUserInterface.tgz

6. Copy all the files in the system directory to your local library directory e.g.

> cp system/* /usr/lib

7. Install the driver.

> cd redist/driver

> make install

Note that the driver is a reloadable module. This must be installed at start up by typing the command:

> insmod windrvr

or put this command in the start up script - /etc/profile. Note also that this must be done with root privilege. The device created /dev/windrvr has root access. For other users the permissions will have to be changed.

8. Add the following commands to /etc/profile:

> DIMEDATA=/usr/local/nallatech/mdf (or wherever you've installed the software).

> DIMEBOARDDATA=/usr/local/nallatech/bdf/ (note the final '/' at the end of bdf but not for mdf.)

> LD_LIBRARY_PATH=/usr/lib

> export DIMEDATA DIMEBOARDDATA LD_LIBRARY_PATH

9. The FUSE framework is now installed. Consult your motherboard User Guide for details on how to install your specific card(s). Installation instructions can also be found in the Linux folder on your motherboard CD. Before starting the FUSE Software you may need to reboot your PC.

10. Once you reboot your PC, to start the user interface go to the FUSE bin directory and type in sh fuse.

>cd /usr/local/nallatech/bin

>sh fuse

3.4   TCP/IP Server Installation

3.4.1   Windows Installation

The TCP/IP server is automatically installed during the FUSE installation.

3.4.2   Linux Installation

After installing FUSE there are some extra steps that must be taken to allow the TCP/IP server to function.

- Copy the file %Installation Directory%/bin/fuse to /usr/sbin/fused

  o   cp /usr/local/Nallatech/bin/fused /usr/sbin

- Set up the environmental variable FUSE_TCPIP_PORT

  o   Edit the file /etc/profile

  o   Type in the line

- FUSE_TCPIP_PORT=%PortNum%
  - where %PortNum% is the number of the port you want the server to listen to.
  - Type in the line
    - export TCPIP_PORT_NUM
- If you want the server to automatically start when you boot up your PC
  - Edit the file /etc/profile
  - After setting all the environmental variables type in
    - fused start

Part 3

Implementation Guide

This part of the User Guide contains information on how to use the FUSE System Software. In the following Sections:

- Section 4: How to open a card

- Section 5: How to configure a device

- Section 6: Using DIMEScript

- Section 7: Using the programmable buttons

- Section 8: Using the TCP/IP function

Section 4

How to open a card

In this Section:

- How to Open Cards

4.1 Open Cards

This Section describes the process of using the FUSE System Software to find cards over a specific interface. Use the following procedures to open a card:

1. On the Windows task bar, click:

   Start -> Programs -> FUSE -> Software -> FUSE Probe

2. When the user interface is loaded there are no cards open. In the FUSE Probe program window shown in Figure 3, select **Card Control\Open card** from the menu at the top of the window.
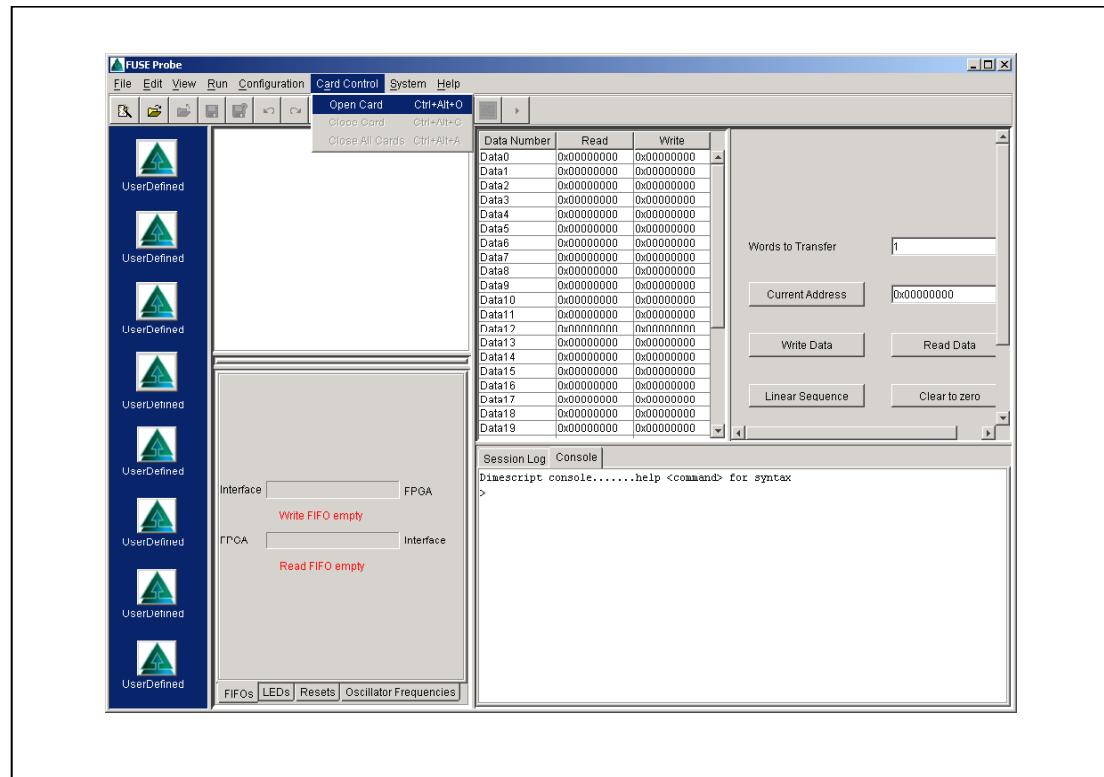
Figure 3: FUSE System Software GUI
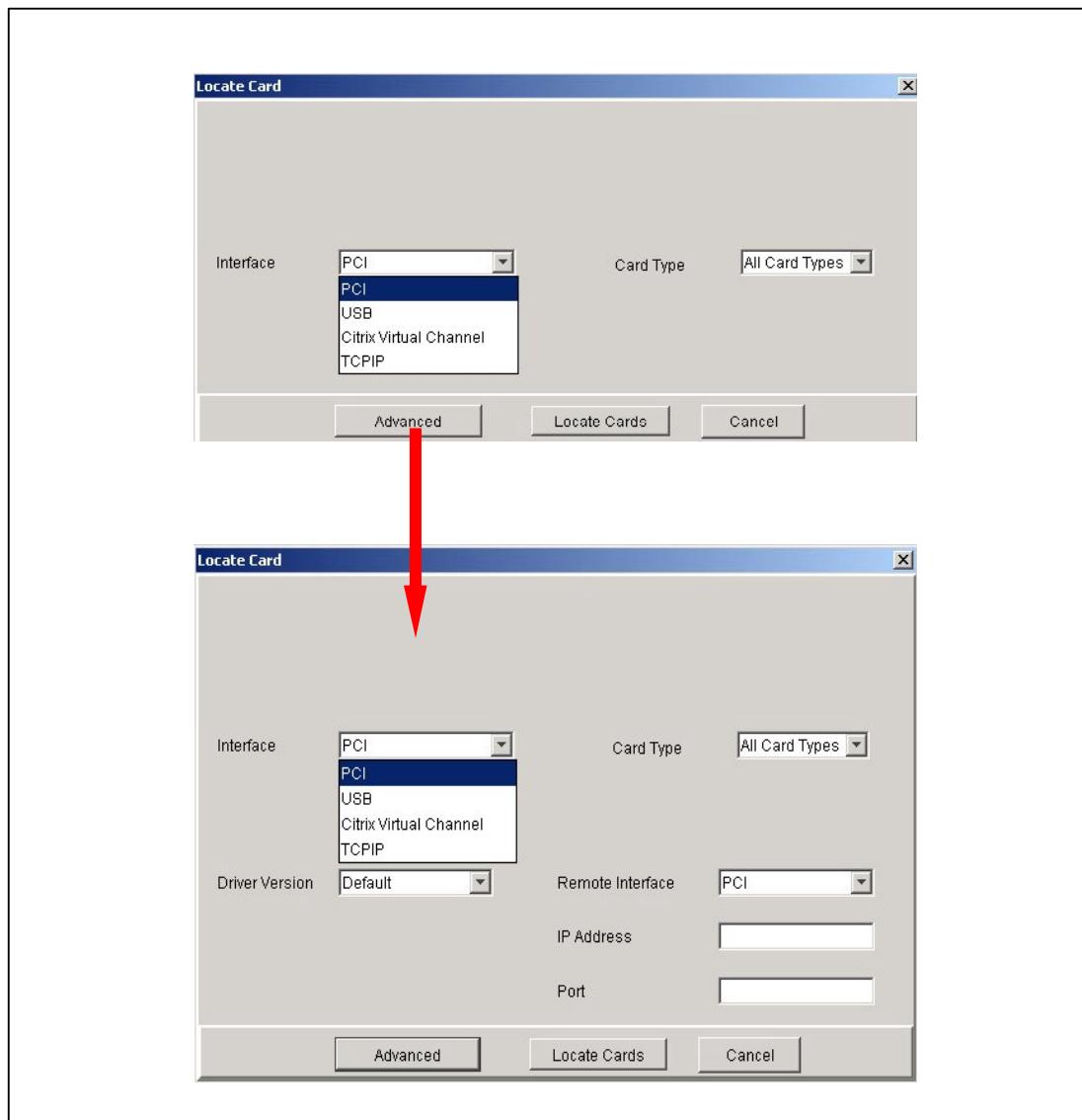
Figure 4: Dialogue box to locate cards

3.   The Locate Card window is then displayed as shown in Figure 4. Select the interface type in the **Interface** box, and the card type in the **Card Type** box. Step 5 explains the purpose of these boxes in more detail.

4.   Click the **Advanced** button to expand the dialogue box and see the full list of card options.

5.   In this dialogue box there are two-principle drop down menus. The first is the interface type, which provides options for PCI, USB, Citrix Virtual Channel or TCPIP. The second pull down menu is the Card Type menu which allows you to select a specific type of card or to search for all cards. This example describes how to open a Strathnuey and a Ballynuey2 over the PCI bus. The PCI interface is selected and All Card Types is selected. Once this is done click on the **Locate Cards** button.

6. ⚙When **Locate Cards** is pressed another dialogue box is displayed showing the cards found. This is shown below in Figure 5:
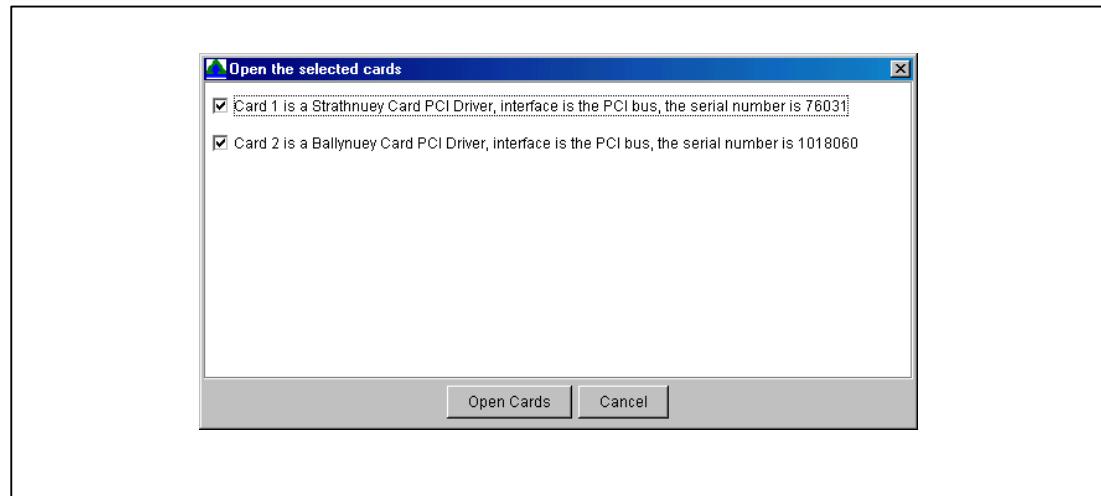
Figure 5: Dialogue box to open cards

7. ⚙Figure 5 shows that a Strathnuey and a Ballynuey card were found. To open the cards, ensure the check box of the desired card is ticked and then click on the **Open Cards** button. Both cards are now open which is shown in the tree display in Figure 6:
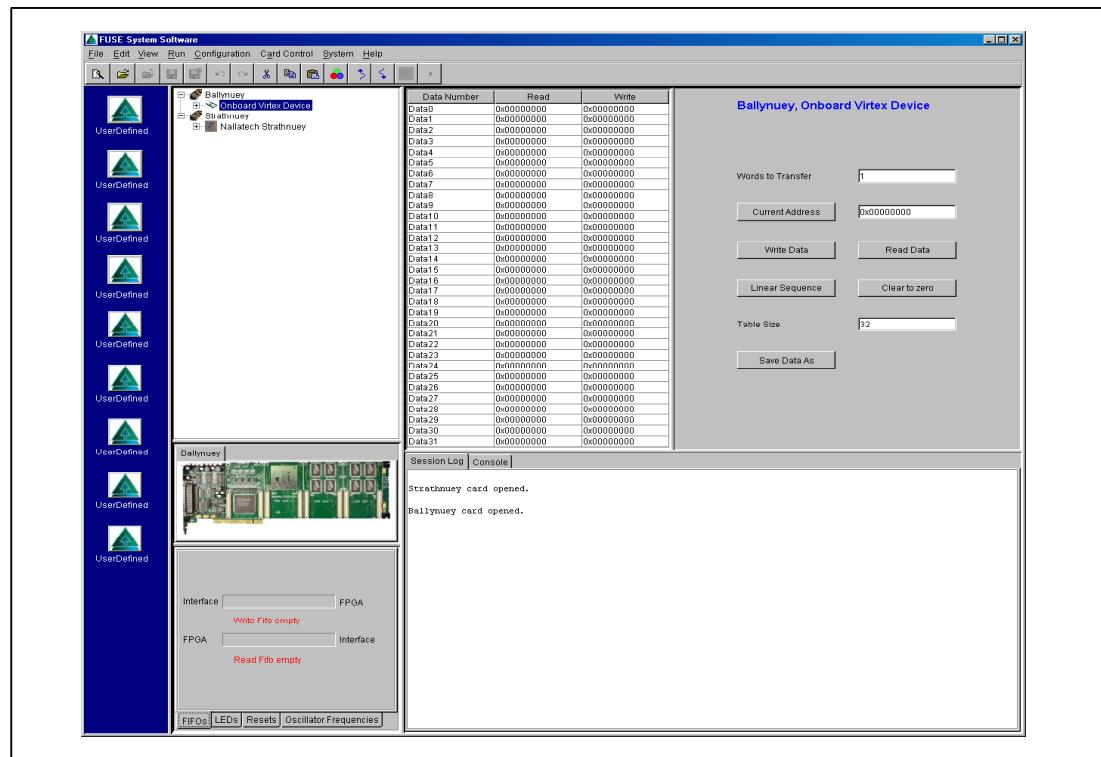
Figure 6: GUI showing two cards opened

8. ⚙To close a specific card or all of the cards click on the **Card Control** menu. **Close Card** will close the card that is selected on the tree, **Close All Cards** will close all opened cards.

Section 5

How to configure a device

In this Section:

- How to configure an FPGA
- Saving System Definition

5.1 How to Configure an FPGA

This Section describes how to use the FUSE System Software to download a bitfile. The bitfile is used to configure the onboard FPGA on the Ballynuey2 card that was opened in Example 1. Use the following procedures to configure the FPGA:

1. ⊕After both cards have been opened, as described in Example 1, the screen should look similar to Figure 7:
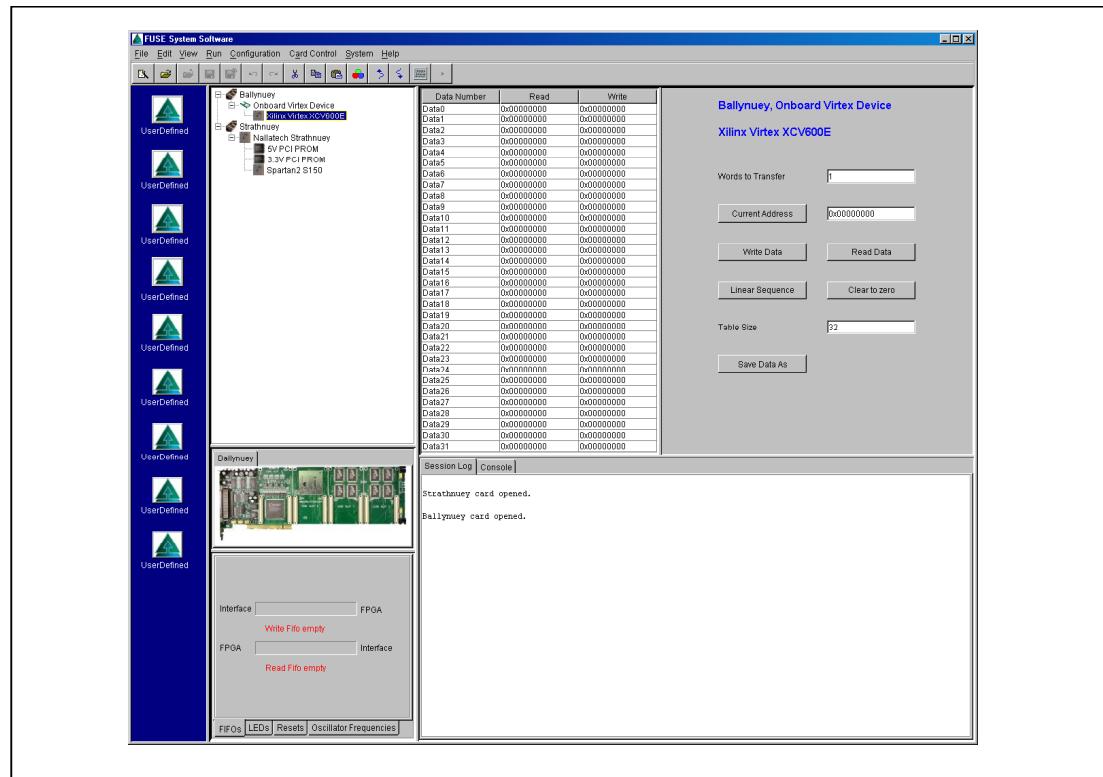
Figure 7: GUI with two cards opened

2. ⌐To assign the bitfile, click on the device to which you want to assign the bitfile - in this case the Virtex XCV600E. Click on the **Configuration** menu bar and then select **Assign Bitfile**. The following file-chooser dialogue box appears:
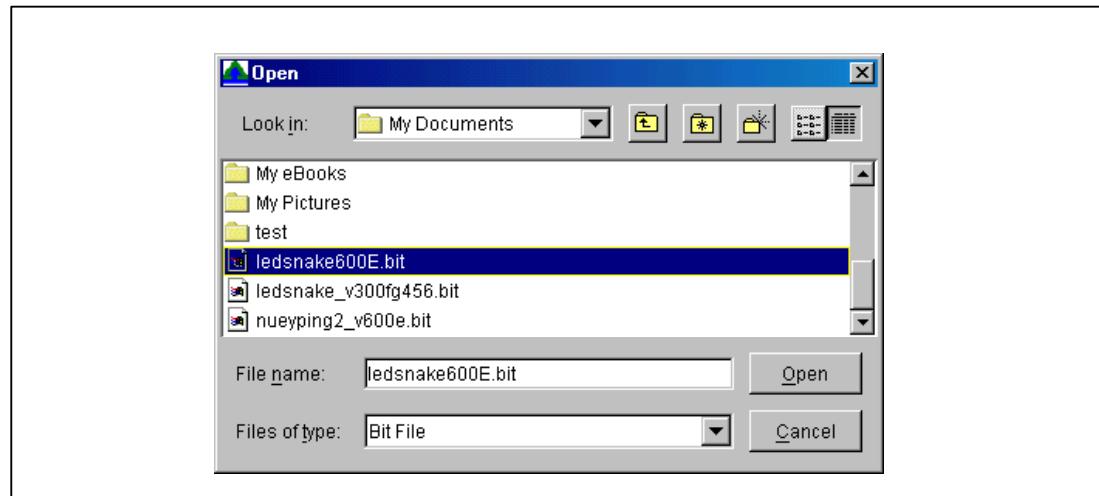
Figure 8: File-chooser dialogue box

3. ⌐Select "ledsnake600E.bit" and click on **Open**. The bitfile is now assigned to the onboard Virtex XCV600E that was selected in Step 2. When the bitfile is assigned the session log is updated to show that the bitfile has been assigned as shown in Figure 9.

It is important that the correct bitfile is downloaded for the specific device. The FPGA on the Ballynuey2 is a Virtex XCV600E; therefore the bitfile has been compiled specifically for an XCV600E.
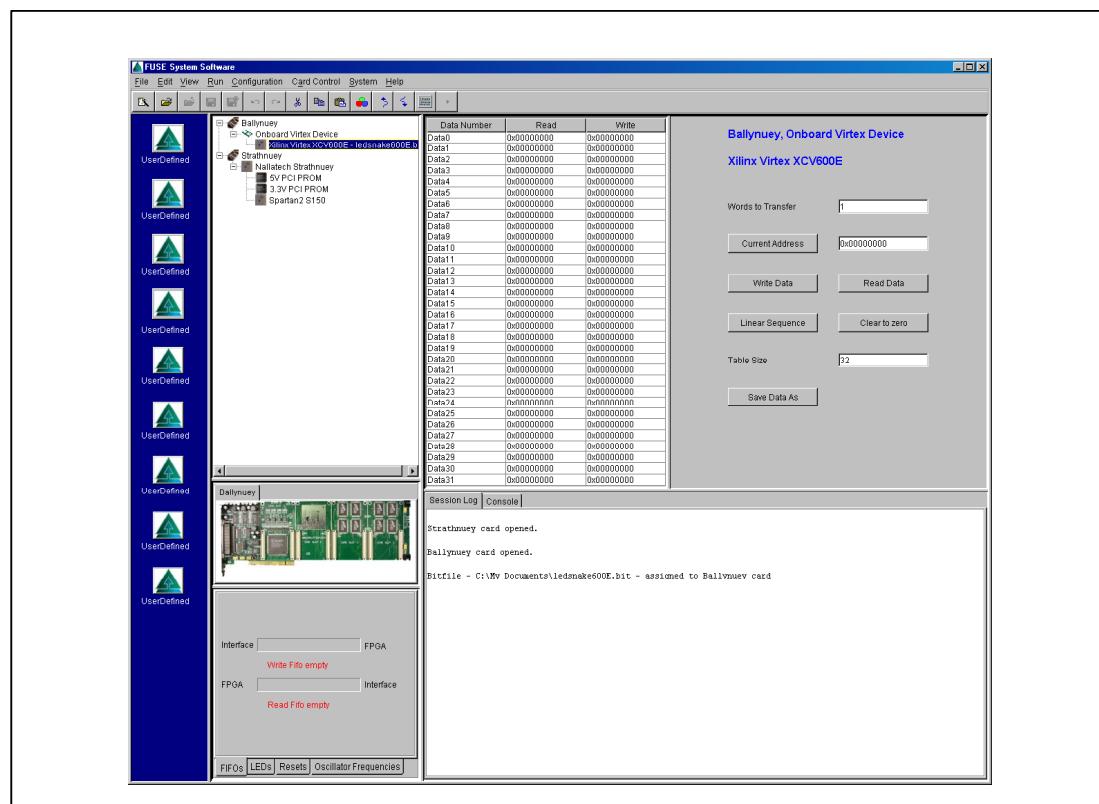
Figure 9: Bit file assigned to FPGA

4. ⊕To configure the device select it in the tree display, then in the **Configuration** menu bar click on **Configure Device**. The bitfile is now loaded and the session log updated as shown below in Figure 10:
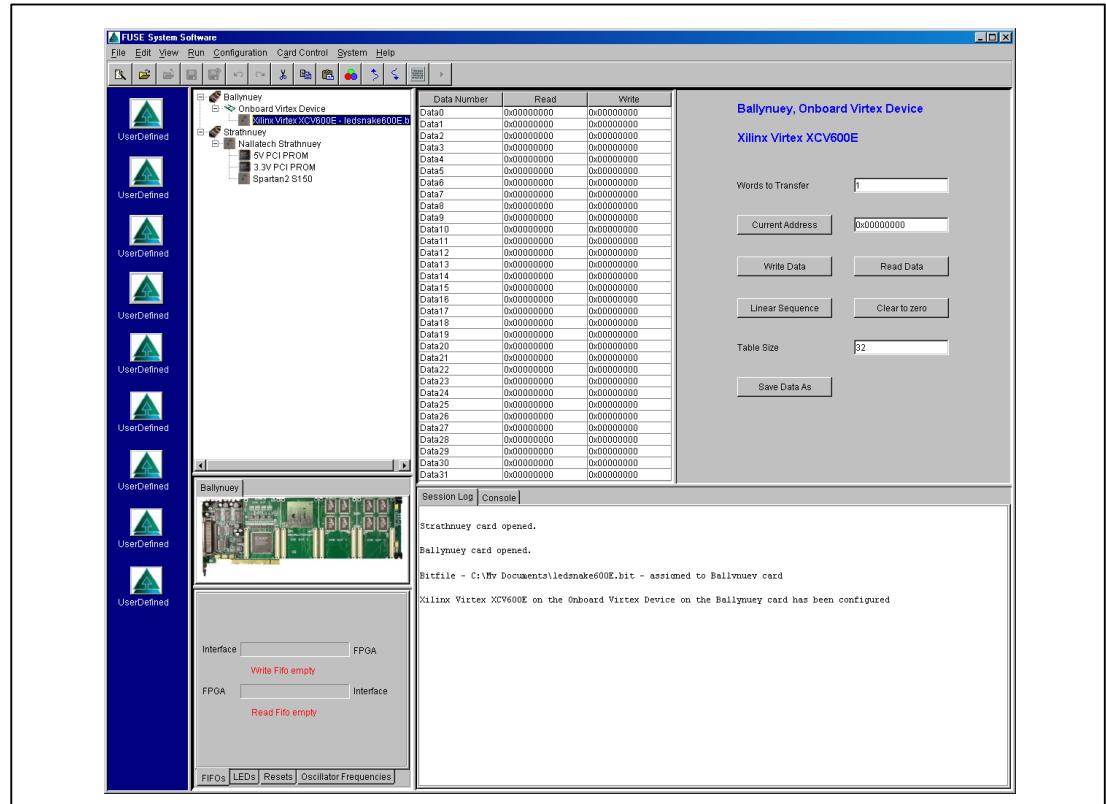
Figure 10: FPGA configured

5. ⊕After FPGA configuration a full interface and FPGA reset should be carried out. Under the tree diagram there are four tabbed panes. Click on the **Resets** tab then click on the **Interface Reset** button. Complete the reset by toggling the **FPGA Reset** check box on and off again. The Ledsnake design should now be running on the Ballynuey card.

5.2 Saving System Definition

It is now possible to save all the information about the open cards to a file. Use the following procedures to save the system definition:

1. ⊕In the **System** menu bar select **Save System Definition**. Before the system definition can be saved, the card definition of all open cards must be saved first. Click on **Save System Definition**, which prompts you to save the first card. The card definition file has the extension fcd. Once all the cards are saved another dialogue box prompts you to name the system file. The system file has the extension of fsd.

2. ⊕Once the fsd file has been saved, the system can be set up again by selecting **System** in the menubar and then **Load System Definition**. This opens all cards automatically and assigns the bitfiles to the appropriate FPGA. To configure the FPGAs go to **Configuration** in the menubar and click on **Configure All Cards**. The resets for the cards may also need to be toggled.

Section 6

Using DIMEScript

In this Section:

- Using DIMEScript Console
- Running a DIMEScript file

6.1   Using DIMEScript Console

DIMEScript has been developed by Nallatech as a simple method of accessing cards without the need to resort to programming. DIMEScript is an interpreted language which means that the language is read in line-by-line and appropriate actions taken. This, in turn, means that any errors in the script are only found when the relevant line is executed.

This is in contrast to a compiled language where the required action is checked in advance and made into a more machine friendly form. In the case of the compiled language, syntax and other features can be fully checked before running the code.

DIMEScript allows users to:

- Open a Nallatech card
- Read data from the card
- Write data to the card
- Access various specific card functions

For more information on the syntax and a more detailed description on how to use DIMEScript, please see the DIMEScript User Guide supplied on the FUSE System Software CD.

To open a card using DIMEScript the "opencard" command is used. The syntax for this command is shown below in Figure 11 while Figure 12 on page 26 shows the "opencard" command in the FUSE GUI.

```
Dimescript console.......help <command> for syntax
>help opencard
Syntax Key :
  Dn   data area D0-Df
  <>   user supplied parameter
  []   optional parameter
  A|B  parameter A or parameter B (exclusive or)

Syntax : opencard [PCI|USB <boardnumber>]
```

Figure 11: Syntax for opencard DIMEScript command

So "opencard PCI 2" opens the second card found on the PCI bus. To configure a device with DIMEScript, the "config command" is used. To configure the onboard FPGA of the Ballynuey2 the following command line is used.

"config 0 0 c:\Mydocu~1\ledsnake600e.bit"

For a list of all possible commands type "help" followed by return. For help on the syntax for a specific command simply type "help" followed by the command.
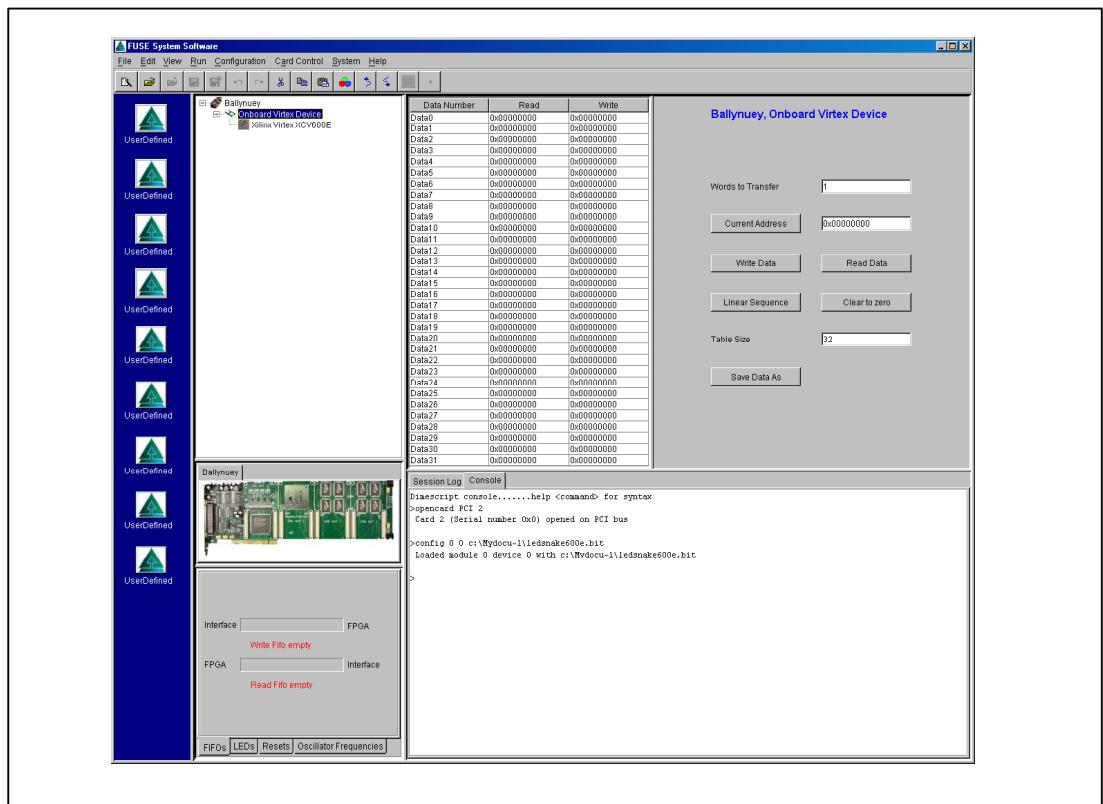
Figure 12: Opencard with DIMEScript

6.2 Running a DIMEScript File

Another feature of DIMEScript is the ability to write a series of commands in a text file. Use the following procedures to run a DIMEScript file:

1. ⊕Click on the **File** menu and select **New** to bring up a new blank DIMEScript file as shown in Figure 13:
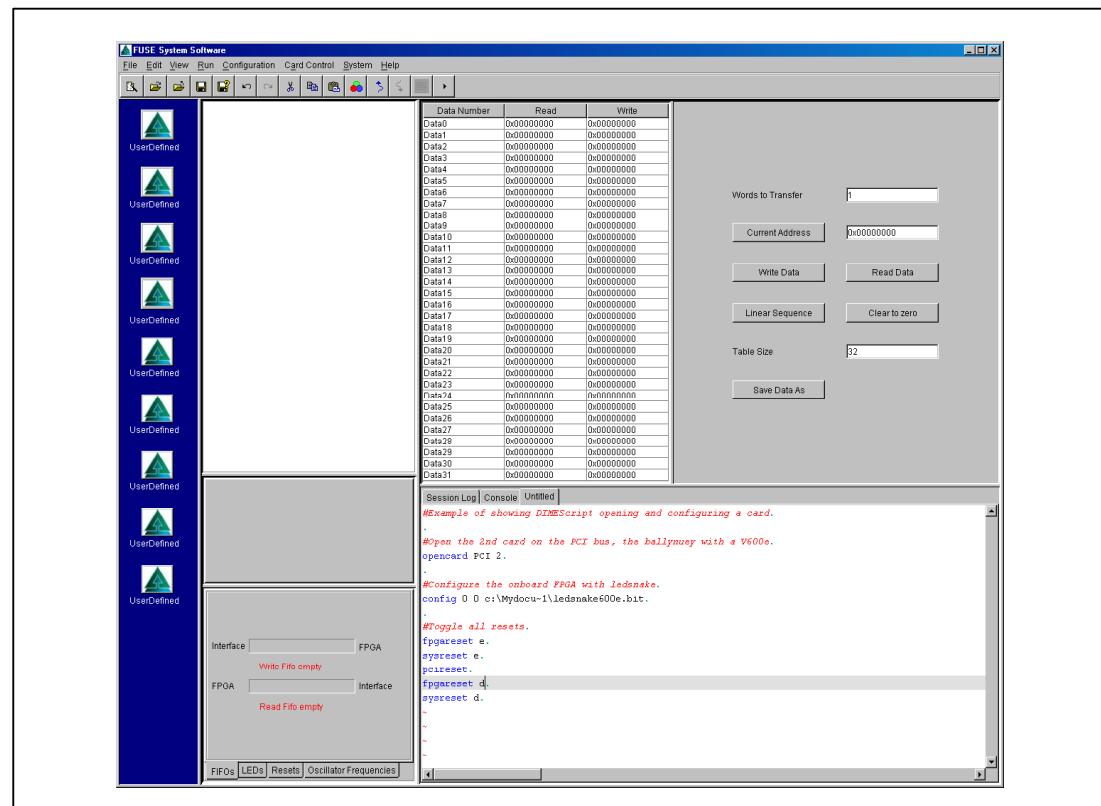
Figure 13: New DIMEScript editor

2. To run the DIMEScript file click on the **Run** menu and select **Run Script File**. The script file is automatically saved. Once the file has been run, the file information is written to the session log as shown in Figure 14.
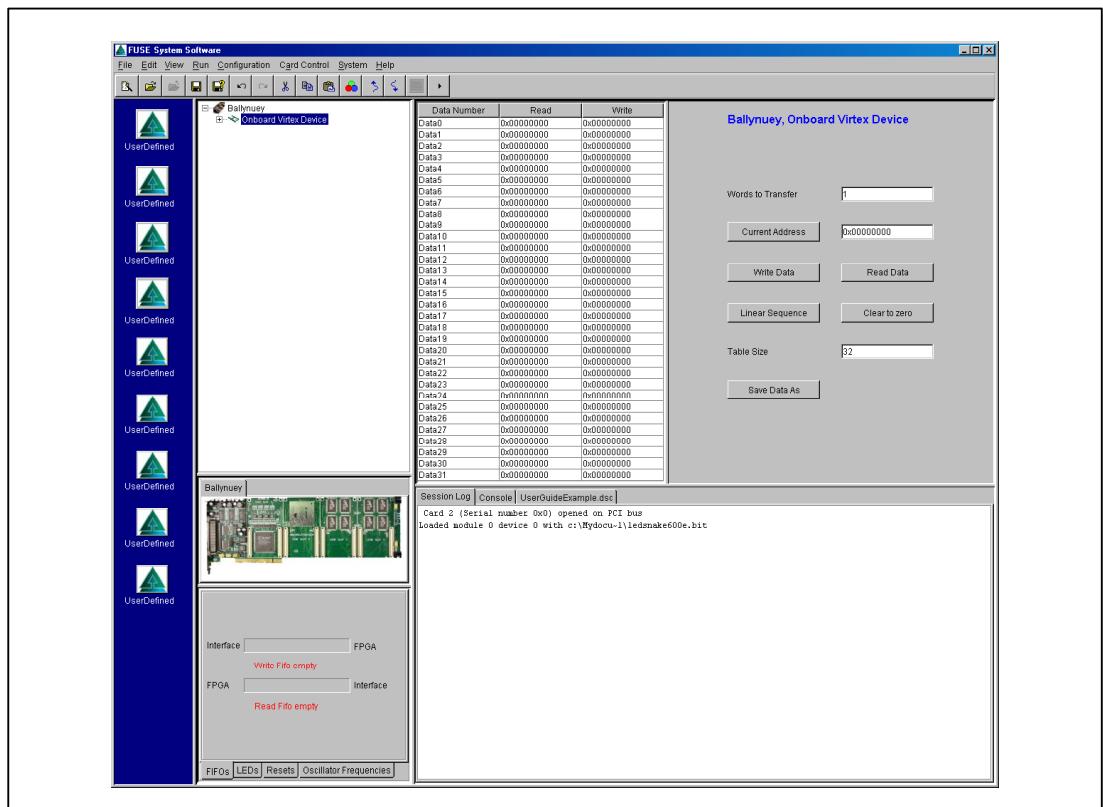
Figure 14: Session log after DIMEScript file has been run

Section 7

Using the Programmable buttons

In this Section:

- Setting the icon and name of the button

- Set button for a view

- Set button for a System file

- Set button for a DIMEScript file

- Set button for executing a file

7.1 Setting the icon and name of a button

There are a series of user programmable buttons on the left side of the FUSE GUI. Each button can be allocated a name and an icon which serves as a reminder of its function. To programme individual buttons use the following procedures:

1. ☞Right click on the button you want to programme. The **Define Button** dialogue box appears which contains two tabs. Select the **Button Details** tab. In the **Button Name** box enter the name chosen for the button. In the **Button Icon (JPEG/GIF)** box enter the file path to the icon chosen for the button. This must be in JPEG or GIF file format. Use the **Browse** button to locate the file.
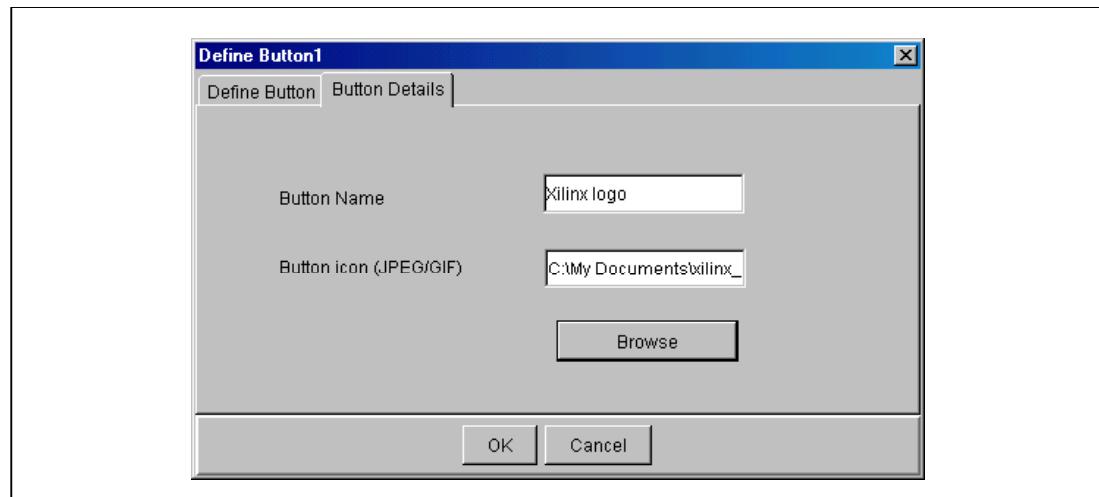
Figure 15: Define Button dialogue box

2.   Click on **OK**. The new button details are now displayed in the FUSE GUI as shown in Figure 16:
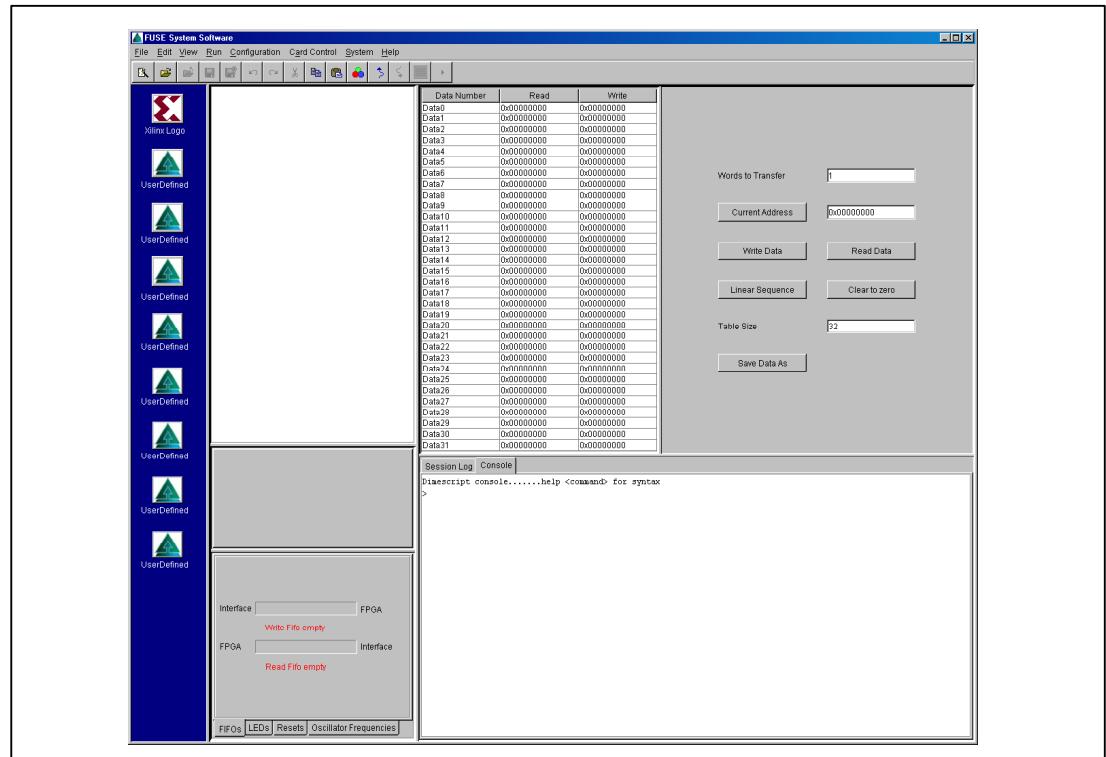
Figure 16: Button with new name and icon

7.2   Set button for a view

To save particular views of the screen use the following procedures:

1.   ↱Right click on one of the programmable buttons. This brings up the **Define Button** dialogue box again.
2.   ↱Select the **Define Button** tab and choose **View** in the drop-down menu as shown in Figure 17.
3.   ↱Click **OK** to save the current view of the GUI to the programmable button that was selected. When you return to the GUI and change the view, click on the left mouse button to return to the view that was saved.
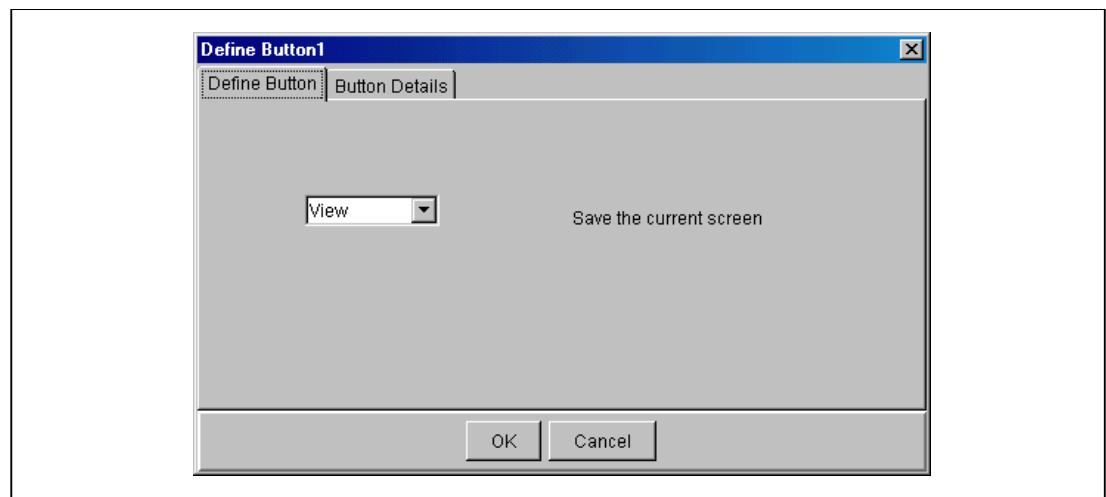
Figure 17: Configure a button to change the view

7.3 Set button for a system file

You can set a button to automatically load a system file with the option to automatically configure all devices and toggle all resets. To set a button for a system file use the following procedures:

1. ⏚Right click on one of the programmable buttons to bring up the **Define Button** dialogue box.
2. ⏚Select the **Define Button** tab and choose **System File** in the drop-down menu.
3. ⏚In the blank text box type the file path for the Fuse Definition File. Click the **Browse** button to locate the file.
4. ⏚If you want to automatically configure all of the cards and toggle all of the resets then tick the check boxes as shown in Figure 18.
5. ⏚Click the **OK** button. Click the left hand mouse button on the programmable button to open the system file.
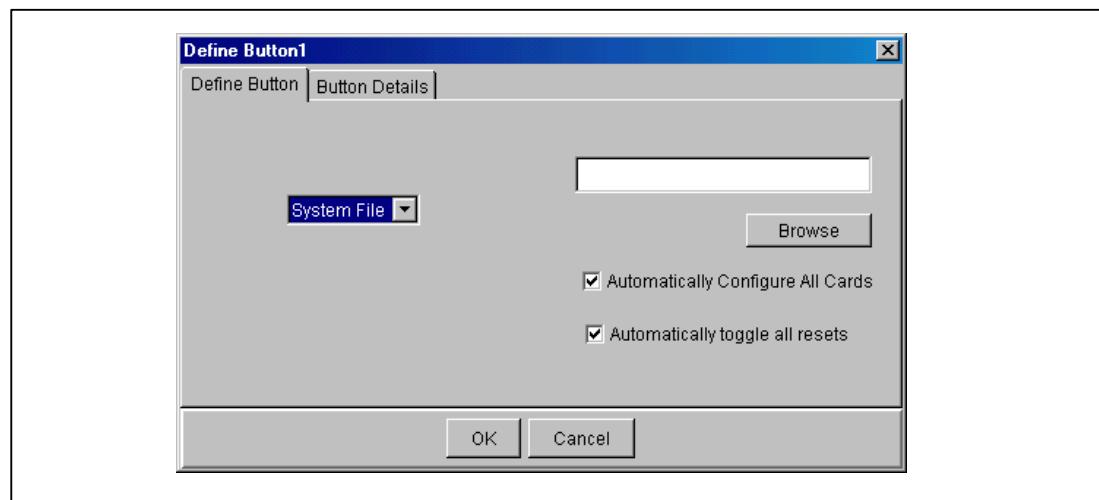
Figure 18: Configure a button for a system file

7.4 Set button to open a DIMEScript file

A button can be programmed to automatically open a DIMEScript file with the option of automatically running the DIMEScript file.

1. ⏚Right click on one of the programmable buttons to bring up the **Define Button** dialogue box.
2. ⏚Select the **Define Button** tab and choose **DSC File** in the drop-down menu.
3. ⏚In the blank text box type the file path for the DIMEScript File. Click the **Browse** button to locate the file.
4. ⏚Tick the check box if you wish to automatically run the DIMEScript file.
5. ⏚Click the **OK** button. The programmable button can now be used for opening and running the DIMEScript file. Click the left hand mouse button on the programmable button to open the file.
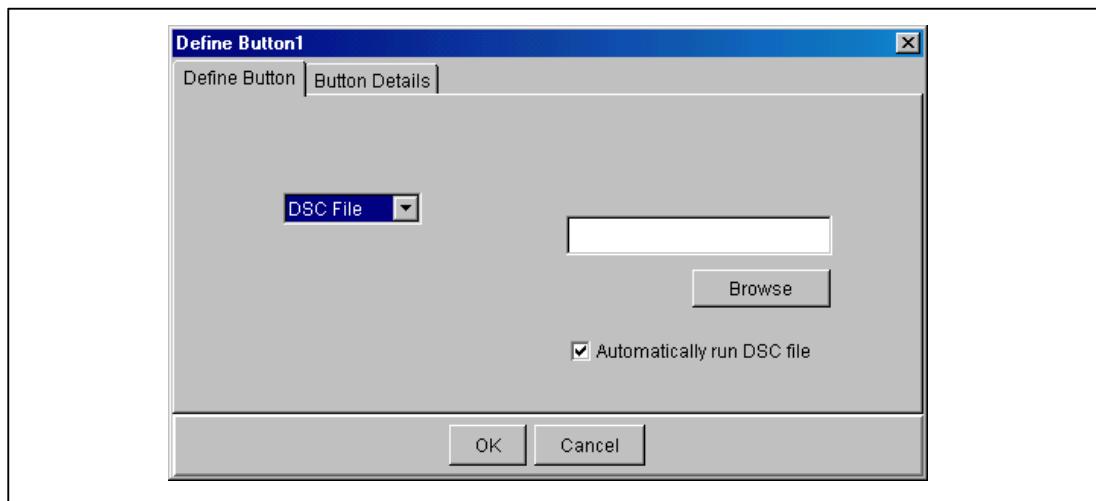
Figure 19: Configure a button for a DIMEScript file

7.5 Set a button for executing a file

To set a button to run an executable file use the following procedures:

1. ⼦Right click on one of the programmable buttons to bring up the **Define Button** dialogue box.
2. ⼦Select the **Define Button** tab and choose **Run File** in the drop-down menu.
3. ⼦In the blank text box type the file path for the executable or batch file. Click the **Browse** button to locate the file.
4. ⼦Click the **OK** button. The programmable button can now be used to run a file. Click the left hand mouse button on the programmable button to open the file.
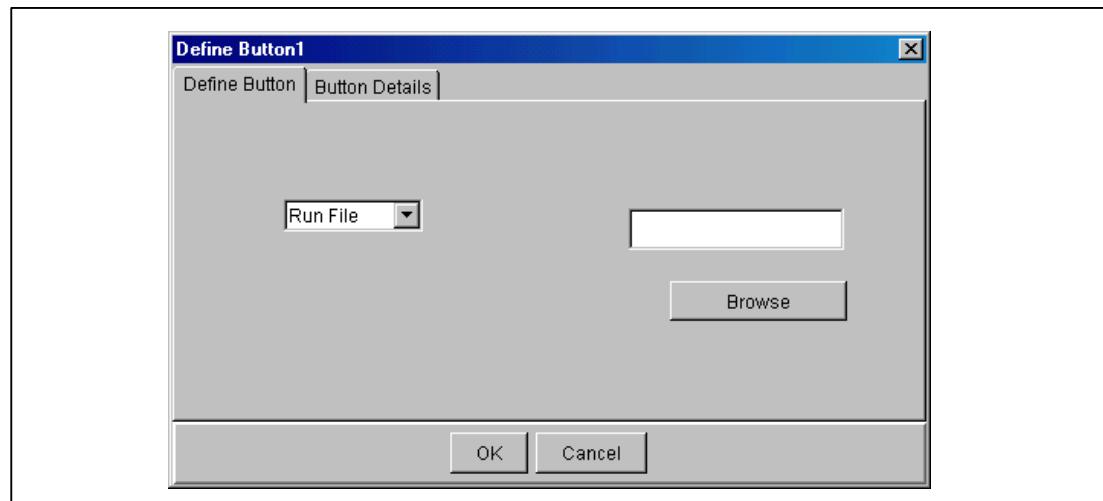
Figure 20: Configure a button to run an executable file

Section 8

Using the TCP/IP Function

In this Section:

- ▪ FUSE TCP/IP Description

8.1   FUSE TCP/IP Description

The TCP/IP protocol on which the Internet is based is a two-layer protocol. The top layer, IP, is concerned with the delivery of data to the correct address, while the layer beneath this, TCP, ensures integrity of data between the transfers.

Using this protocol along with FUSE it is possible to control a Nallatech motherboard over a LAN or even the Internet as if the motherboard was plugged into your own PC. With FUSE TCP/IP you can control the card with the FUSE Probe tool or through the FUSE API.

8.2   Windows TCP/IP

8.2.1   TCP/IP Dialogue Box

When FUSE is installed, an icon appears in the system tray on the bottom right hand corner of the Windows taskbar as shown below:

Figure 21: FUSE System Tray Icon

Right click on this icon and select **TCPIP Properties** to bring up the following dialogue box shown below:
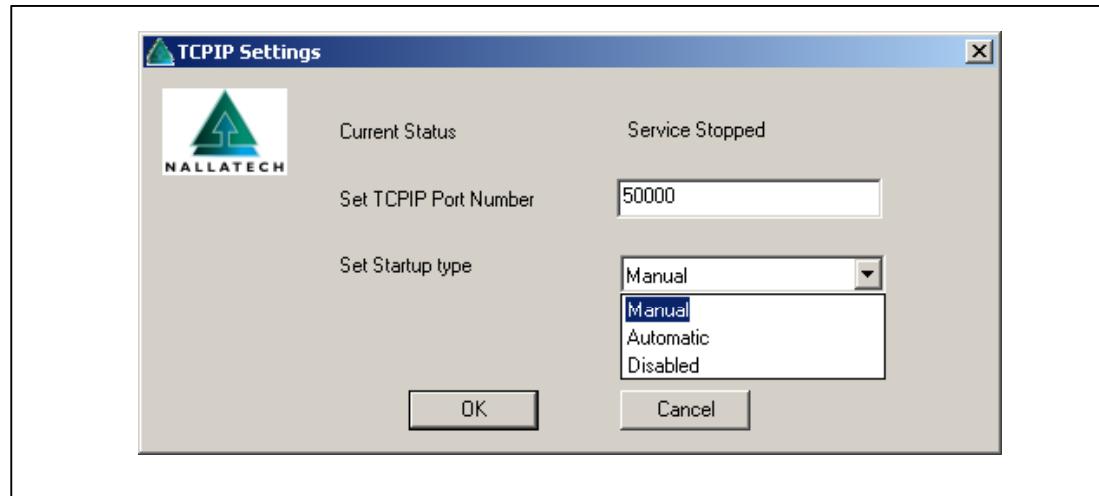
Figure 22: TCP/IP settings

The **Current Status** shows the status of the service - whether it is running or stopped. The **Set TCPIP Port Number** box allows the port number to be entered. The Set Startup type box allows you to select when the service is to be started - this can be manually or every time the PC is booted.

8.2.2   Starting and stopping the Service

To start or stop the service right click on the icon in the system tray and click on either **Start TCPIP** service or **Stop TCPIP** service.
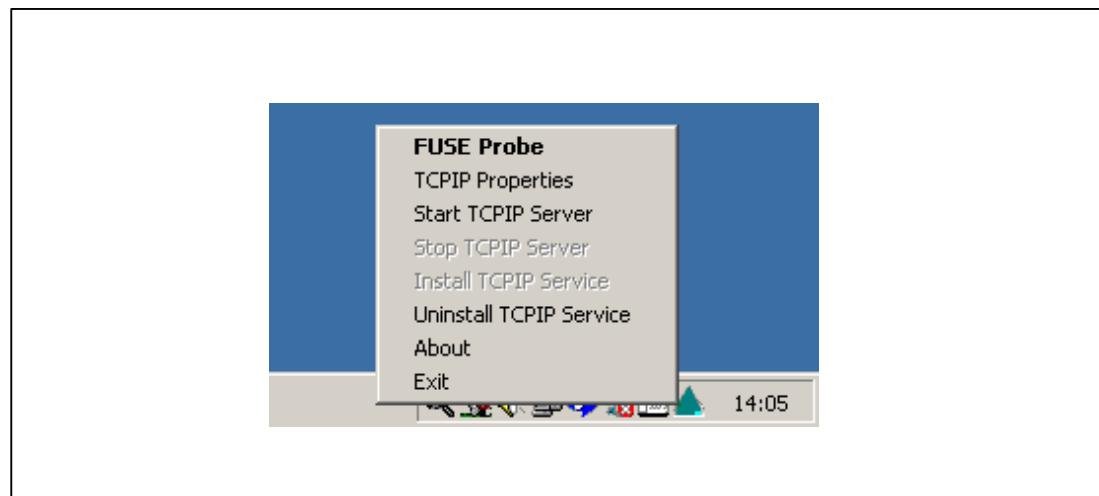
Figure 23: Start and stop the Service

The **Install TCPIP Service** and **Uninstall TCPIP Service** options install the server as a windows service. Services can also be started and stopped with the services application in the Administrative tools in the control panel. Once the service has started clients can then use the Nallatech hardware on the server PC.

8.3 Linux TCP/IP Server

8.3.1 Starting and stopping the Service

After following the instructions on installing the FUSE TCPIP, control of the service is done through fused daemon. To start the server, type:

- fused start

To stop the server type:

- fused stop

To get a full list of possible commands type:

- fused *

Once the service has started you can then use the Nallatech hardware that is on the server PC.

8.4 TCP/IP Client

8.4.1 Locate a Card

In order to locate a card using the FUSE TCPIP function there are three fields which must be filled out in the Locate Card dialogue box. The remote interface, that is the interface the card is plugged into, the IP address of the server and the port number the server is listening to.

In the Locate Card dialogue box select **TCPIP** as the interface and click the **Advanced** button to set the TCPIP settings.
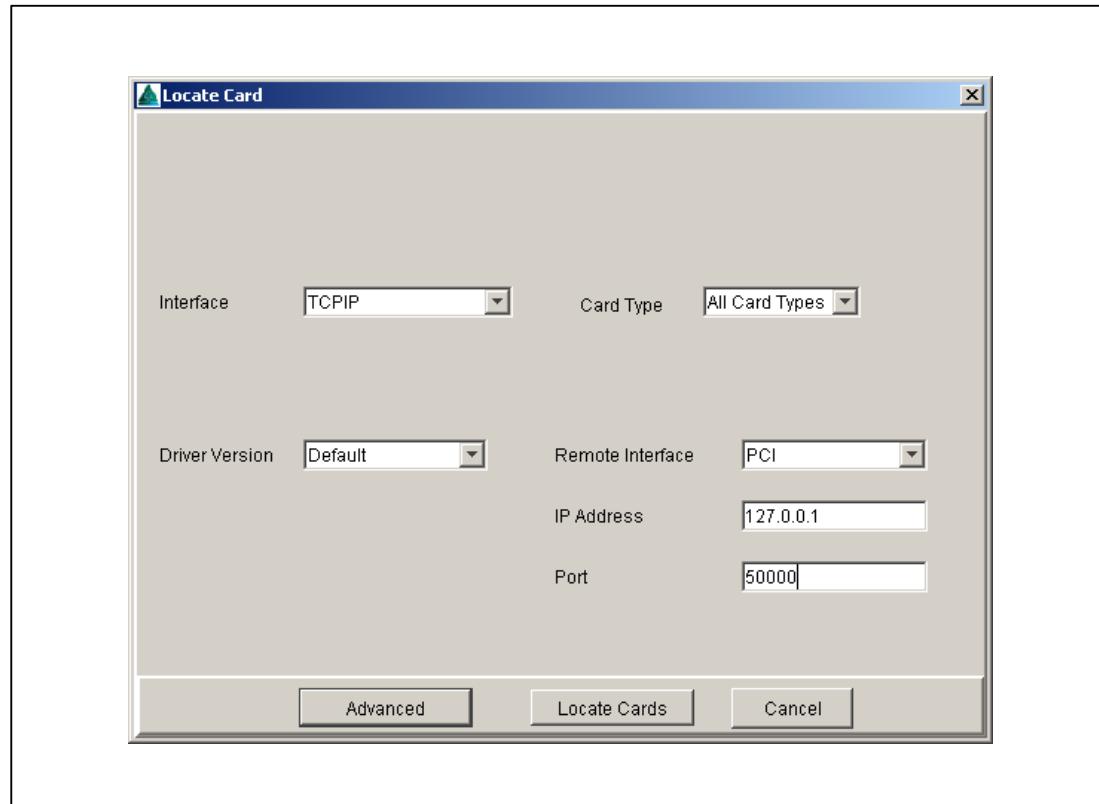
Figure 24: TCP/IP probe tool

Once the **Remote Interface**, **IP Address** and the **Port** number are complete, click on the **Locate Cards** button. From this point on there is no difference between using the card plugged in to the local PC and using the card over TCPIP.

8.4.2 Using C/C++ API

When using the C/C++ API over TCPIP interface there is only one function that changes slightly - the DIME_LocateCard function. The DIME_LocateCard details are shown below.

Syntax   LOCATE_HANDLE DIME_LocateCard(int LocateType, DWORD MBType, void* LocateTypeArgs, DWORD DriverVersion, DWORD Flags)

Arguments   LocateType: This is the interface that the locate is performed over. The table below provides further details.

LocateType	Description
dlPCI	Searches for all Nallatech cards over the PCI interface.
dlUSB	Searches for all Nallatech cards over the USB interface.
dlCITRIX	Searches for all Nallatech cards over a citrix virtual channel
dlTCPIP	Searches for all Nallatech cards over a TCP/IP connection

MBType: This argument is used to specify which particular Nallatech motherboard is to be located (the motherboard type). The table below gives details for the MBType.

MBType	Description
mbtALL	All Nallatech motherboards.

mbtNONE	No motherboard type not recognised. Not valid for this function.
mbtTHEBALLYINX	The Ballyinx.
mbtTHEBALLYNUEY	The Ballynuey.
mbtTHEBALLYNUEY2	The Ballynuey2.
mbtTHEBALLYNUEY3	The Ballynuey3.
mbtTHEBENERA	The Benera.
mbtTHESTRATHNUEY	The Strathnuey.

LocateTypeArgs: This argument is used to provide any specific additional information that is required to locate a card over a specified interface. The table below details what information should be provided dependant on the interface.

LocateType	LocateTypeArgs
dlPCI	NULL
dlUSB	NULL
dlCITRIX	DIME_CITRIX
dlTCPIP	DIME_TCPIP

The DIME_CITRIX and DIME_TCPIP parameters are structures defined in the dimesdl.h headerfile.

DriverVersion: This argument is used to specify a particular software driver that is to be used when controlling the particular card. This is only required for advanced users. If the specific driver version number is known then this number can be used. Otherwise an option from the table below should be used.

DriverVersion	Description
dldrDEFAULT	This locates the latest driver installed on your system for each card found.
dldrALL	This locates all drivers installed on your system for each card found.

Flags: This argument allows the locate process to be customised to suit your development requirements. The table below gives details for the Flags.

Flags	Description
dlDEFAULT	This is the default option for the locate. It does not get the serial number from the cards.
dlSERIALNUM	Since getting the serial number from all the cards is a lengthy (approximately a second per card) process this information is not requested in the default option. If the serial number is required then specifying this flag will bring back the serial number for all cards.

Return   Returns a handle to information pertaining to the detected cards. Returns NULL on failure. The return type LOCATE_HANDLE is defined as a void pointer.

Description   This function must be called before all other functions. It searches the specified interface for the specified Nallatech motherboards and returns a handle, which is subsequently used to open a chosen card.

Example:

```
#include <dimesdl.h> //This is held in the include directory
                             within FUSE.
DIME_HANDLE hCard1;
LOCATE_HANDLE hLocate;
DWORD LEDs;
DIME_TCPIP* LTA;

LTA = (DIME_TCPIP*)calloc(1, sizeof(DIME_TCPIP));

LTA->LocateType = dlPCI;        //Remote interface is PCI
LTA->mbt = mbtALL;              //Search for all motherboards
strcpy(LTA->IPAddress, "127.0.0.1");        //Set IP Address
LTA->Port = 50000;                          //Set Port Number
LTA->LocateTypeArgs = NULL;     //Set remote locate type args Null
LTA->DriverVersion = dlDEFAULT;     //set driver version to default
LTA->Flags = dlSERIALNUM;       //Set serial number flag

//Locate the Cards on the PCI interface
hLocate=DIME_LocateCard(dlTCPIP,mbtALL,LTA,dldrDEFAULT,dlDEFAULT);

//Open the first card found in the locate.
hCard1=DIME_OpenCard(hLocate,1,dccOPEN_DEFAULT);

//Change the LEDs
LEDs=DIME_ReadLEDs(hCard1);
DIME_WriteLEDs(hCard1,(LEDs-1));

//Close the card down.
DIME_CloseCard(hCard1);

//Finally close the locate down.
DIME_CloseLocate(hLocate);
```

Figure 25: DIME_LocateCard example

Part 4

Reference Guide

This part of the User Guide contains reference information on the FUSE GUI, in the following Sections:

- Section 9: Menu bar
- Section 10: Toolbar and popup menu
- Section 11: User Programmable buttons

Section 9

Menu bar controls

In this Section:

- File Menu
- Edit Menu
- View Menu
- Run Menu
- Configuration Menu
- Card Control Menu
- System Menu
- Help Menu

9.1 File Menu

The file menu allows you to open, close and save DIMEScript files. For more information about DIMEScript see the DIMEScript User Guide provided on the FUSE CD. The File menu contains the following functions:

File -> New – This brings up a new untitled DIMEScript text document for you to write a script file. Multliple DIMEScript files may be opened at any one time.

File -> Open – This brings up a menu chooser for you to find a saved DIMEScript file.

File -> Close – This closes the DIMEScript file currently selected. If the file has not been saved or if the file has been modified since the last save point, a dialogue box appears, prompting you to save the file.

File -> SaveAs – If the DIMEScript file has never been saved or if you want to save the DIMEScript file under a different name then this option will bring up a file chooser dialogue box for you to enter the name of the file. The file is saved with the extension "dsc".

File - > SaveFiles – This option will bring up a dialogue box for you to select the DIMEScript files that you want to save.

File -> Print – This option will print the DIMEScript file to a selected printer.

File -> Exit – This option closes the FUSE System Software.

9.2 Edit Menu

The Edit menu provides the following list of features:

Edit -> Undo – Undo the previous event.

Edit -> Redo – Redo the event that was undone.

Edit -> Cut – When text is highlighted this option places the selected text to the clipboard.

Edit -> Copy – When text is highlighted this option places a copy of the selected text to the clipboard.

Edit -> Paste – This places the text that is in the clipboard to the DIMEScript text document.

Edit -> Preferences – This brings up a dialogue box to change the keyword colour and comment colour on the DIMEScript editor.

Edit -> Preferences -> Save Settings on Exit – This saves the layout of the user interface and the comment and keyword colours on exit, for the next time you use the FUSE System Software.

Edit -> Preferences -> Load Saved Settings on Startup – If this option is selected, the next time FUSE is started the previously saved settings are loaded. If this option is not selected then the default settings are used.

Edit -> Clear Console – This option clears the DIMEScript Console.

9.3 View Menu

The View Menu contains the following options:

View -> Tree – When this option is selected, the tree view of open cards is shown on the left hand side of the screen.

View -> Grid – This option turns the grid (holding the data to read and write when doing DMA Transfers) on and off.

View -> DMA Transfers – This option turns the area for reading and writing DMA Transfers on and off.

View -> Editor – This turns the tabbed pane that holds the session log, DIMEScript console and DIMEScript editor, on and off.

View -> Image – This turns the picture underneath the tree on and off.

9.4 Run Menu

This menu provides the following options for running DIMEScript files:

Run -> Run Script File – This option runs the currently selected DIMEScript File and automatically saves your DIMEScript file.

Run -> Return Print Messages – If this option is selected print messages after a DIMEScript file is run is sent to the session log.

Run -> Return Error Messages – If this option is selected error messages after a DIMEScript file is run is sent to the session log.

9.5 Configuration Menu

This menu allows you to assign and configure an FPGA with a particular bitfile. The menu contains the following options:

Configuration -> Configure All Cards – This option configures all of the FPGAs in the system with their assigned bitfiles.

Configuration -> Configure Card – This option configures all of the FPGAs in the currently selected card (the card selected in the tree).

Configuration -> Configure Module – This option configures all of the FPGAs in the currently selected module with their assigned bitfiles.

Configuration -> Configure Device – This option configures the currently selected FPGA device with the bitfile assigned to it.

Configuration -> Assign Bitfile – This option assigns a bitfile to a specific FPGA device.

Configuration -> Assign and Configure – This option assigns a bitfile to a specific FPGA device and automatically configures the device.

9.6 Card Control Menu

Card Control -> Open Card – This brings up a dialogue box prompting you to specify the card connection interface and the name of the card you want to open.

Card Control -> Open Card -> Advanced -> Open Card Advanced -> Driver Version – The default option searches for the most up to date driver used for the card. The "All" option searches for all possible drivers for this card.

Card Control -> Open Card -> Advanced -> TCP/IP text boxes – This option searches the TCP/IP interface.

Card Control -> Open Card -> Locate Cards – This option scans the chosen interface for either specific cards or all type of cards. A list of all the cards found is displayed. If the "All" driver version was selected one card may have more than one entry here (one for each driver found).

Card Control -> Open Card -> Locate Cards -> Open Cards – This option opens all of the selected cards.

Card Control -> Close Card – This option closes the currently selected card.

Card Control -> Close All Cards – This option closes all open cards.

9.7 System Control Menu

System -> Load Card Definition – This option loads a saved FUSE Card Definition (fcd) file to an already opened card.

System -> Save Card Definition – This option saves the currently selected card information to a FUSE Card Definition (fcd) file.

System -> Load System Definition – This option loads a saved FUSE System Definition (fsd) file. The cards saved in this fsd file are automatically opened when the file is run.

System -> Save System Definition – This saves the whole system (all of the open cards) to a FUSE System Definition (fsd) file. Before this can be saved each card must have a saved fcd file assigned to it. To do this manually, go through all cards and select System -> Save Card Definition.

9.8 Help Menu

Help -> About – This contains information on the FUSE Probe software.

Help -> Help – This contains the FUSE Probe Help file.

Section 10

Toolbar and Popup Menu Controls

In this Section:

- Toolbar controls
- Tree Popup menu controls

10.1   Toolbar controls

The toolbar provides shortcuts to some of the options in the menu bar. A list of the toolbar buttons and their functions are shown below.

- New. This icon opens a new DIMEScript editor.

- Open. This icon opens a saved DIMEScript file.

- Close. This icon closes the selected DIMEScript file.

- Save. This saves the selected DIMEScript file.

- Save As. This is the save as button for the selected DIMEScript file.

- Undo. Undoes the previous event that happened in the DIMEScript file.

- Redo. Redoes an undo event.

- Cut. This cuts highlighted text from DIMEScript and places it on the clipboard.

- Copy. This copies highlighted text from DIMEScript and places it on the clipboard.

- Paste. This pastes copied or cut text.

- Preferences. This brings up the preferences dialogue box.

- Open Card. This symbol brings a dialogue box so you can open up cards.

- Close Card. This symbol closes the currently selected card.

- Assign and Configure. This icon assigns and configures a specific device with a specific bitfile.

- Run DIMEScript. This icon runs the selected DIMEScript file.

10.2   Tree Popup Menu

Tree right click -> Open Card – This brings up the locate card dialogue box.

Tree right click -> Close Card – This closes the currently selected card.

Tree right click -> Configure all cards - This option configures all of the FPGAs in the system with the bitfiles that are assigned to them.

Tree right click -> Configure Card - This option configures all of the FPGAs in the currently selected card.

Tree right click -> Configure Module - This option configures all of the FPGAs in the currently selected module with the bitfiles that are assigned to them.

Tree right click -> Configure Device - This option configures the currently selected FPGA device with the bitfile that is assigned to it.

Tree right click -> Assign Bitfile - This option assigns a bitfile to a specific FPGA device.

Tree right click -> Assign and Configure - This option assigns a bitfile to a specific FPGA device and automatically configures the device.

Tree right click -> Properties – This option brings up specific information about the selected device/module/card.

Section 11

DMA Transfers Area

In this Section:

- DMA Transfers Area

11.1   DMA Transfers Area

Words to Transfer -> The number in this text box sets the number of words which are transferred during DMA transfers.

Current Address -> This is used to change the address of where the DMA transfer is written to or read from.

Write Data -> The Write Data button transfers the data from the Write column in the table. The number of words transferred and the address written to depends on the Words to Transfer and Current Address fields.

Read Data -> The Read Data button reads data from the motherboard. The address and number of words transferred depends on the Words to Transfer and Current Address fields. The data is written to the read column of the table.

Linear Sequence -> The Linear Sequence button sets the data in the write column to a linear sequence.

Clear to Zero -> This resets all the data in the table to zero.

Table size -> This sets the size of the table.

Save Data As -> This button saves the data in the table as a *.csv file. A *.csv file is a Comma Separated Values file. The format for one line of the table is a value followed by a comma, followed by a value. A *.csv file can be opened up by most spreadsheets.

Section 12

User Programmable Buttons

In this Section:

- Setting the icon and text of button
- Assigning a view
- Assigning a FUSE System Definition file
- Assigning a DIMEScript file
- Assigning the button to run a file

12.1   Setting the icon and text of the button

-> Right click – This will bring up a dialogue box.

-> Right click -> Button details -> Button name – This changes the name of the button that was pressed.

-> Right click -> Button details -> Button icon – Place the path of either a JPEG or GIF image to change the picture that on the button.

-> Right click -> view -> OK – Saves the current layout of the screen. If you change the layout of the screen left click on the button.

-> Right click -> System File – Place the path of the FUSE System Definition file in the appropriate text box. If you want the button to automatically configure all cards and toggle all resets then set the appropriate check box and click on OK. To run the selected FSD file left click on this button.

-> Right click -> DSC File – Place the path of the DIMEScript file in the text box and select whether you want this button to automatically run this DIMEScript file and click on OK. To automatically open and run the DIMEScript file left click on this button.

 -> Right click -> Run File – Place the path of the executable file that you want to run in the text box and click on OK. To automatically run the selected file left click on the button.

 -> Double Left Click – This executes the process that the button was set up for.

Standard Terms and Conditions

GENERAL

These Terms and Conditions shall apply to all contracts for goods sold or work done by Nallatech Limited. (hereinafter referred to as the "company" or Nallatech) and purchased by any customer (hereinafter referred to as the customer).

Nallatech Limited trading in the style Nallatech (the company), submits all quotations and price lists and accepts all orders subject to the following conditions of contract which apply to all contracts for goods supplied or work done by them or their employees to the exclusion of all other representations, conditions or warranties, express or implied.

The buyer agrees to execute and return any license agreements as may be required by the company in order to authorise the use of those licensable items. If the licensable item is to be resold this condition shall be enforced by the re-seller on the end customer.

Each order received by the company will be deemed to form a separate contract to which these conditions apply and any waiver or any act of non-enforcement or variation of these terms or part thereof shall not bind or prejudice the company in relation to any other contract.

The company reserves the right to re-issue its price list at any time and to refuse to accept orders at a price other than at the price stated on the price list in force at the time of order.

The company reserves the right to vary the specification or withdraw from the offer any of its products without prior warning.

The company reserves the right to refuse to accept any contract that is deemed to be contrary to the company's policies in force at the time.

PRICING

All prices shown on the company's price list, or on quotations offered by them, are based upon the acceptance of these conditions. Any variation of these conditions requested by the buyer could result in changes in the offered pricing or refusal to supply.

All quoted pricing is in Pounds Sterling and is exclusive of Value Added Tax (VAT) and delivery. In addition to the invoiced value the buyer is liable for all import duty as may be applicable in the buyer's location. If there is any documentation required for import formalities, whether or not for the purposes of duty assessment, the buyer shall make this clear at the time of order.

Quotations are made by Nallatech upon the customer's request but there is no obligation for either party until Nallatech accepts the customer's order.

Nallatech reserves the right to increase the price of goods agreed to be sold in proportion to any increase of costs to Nallatech between the date of acceptance of the order and the date of delivery or where the increase is due to any act or default of the customer, including the cancellation or rescheduling by the customer of part of any order.

Nallatech reserves the right (without prejudice to any other remedy) to cancel any uncompleted order or to suspend delivery in the event of any of the customer's commitment with Nallatech not being met.

DELIVERY

All delivery times offered by the company are to be treated as best estimates and no penalty can be accepted for non compliance with them.

Delivery shall be made by the company using a courier service of its choice. The cost of the delivery plus a nominal fee for administration will be added to the invoice issued. Payment of all inward customs duties and fees are the sole responsibility of the buyer. If multiple shipments are requested by the buyer, multiple delivery charges will be made. In the case of multiple deliveries separate invoices will be raised.

If requested at the time of ordering an alternative delivery service can be used, but only if account details are supplied to the company so that the delivery can be invoiced directly to the buyer by the delivery service.

The buyer accepts that any 'to be advised' scheduled orders not completed within twelve months from the date of acceptance of the original order, or orders held up by the buyers lack of action regarding delivery, can be

shipped and invoiced by the company and paid in full by the buyer, immediately after completion of that twelve month period.

INSURANCE

All shipments from the company are insured by them. If any goods received by the buyer are in an unsatisfactory condition, the following courses of action shall be taken.

If the outer packaging is visibly damaged, then the goods should not be accepted from the courier, or they should be signed for only after noting that the packaging has sustained damage.

If the goods are found to be damaged after unpacking, the company must be informed immediately.

Under no circumstances should the damaged goods be returned, unless expressly authorised by the company.

If the damage is not reported within 48 hours of receipt, the insurers of the company shall bear no liability.

Any returns made to the company for any reason, at any time shall be packaged in the original packaging, or its direct equivalent and must be adequately insured by the buyer.

Any equipment sent to the company for any purpose, including but not limited to equipment originally supplied by the company must be adequately insured by the buyer while on the premises of the company.

PAYMENT

Nallatech Ltd. terms of payment are 30 days net.

Any charges incurred in making the payment, either currency conversion or otherwise shall be paid by the buyer.

The company reserves the right to charge interest at a rate of 2% above the base rate of the Bank of Scotland PLC on any overdue accounts. The interest will be charged on any outstanding amount from said due date of payment, until payment is made in full, such interest will accrue on a daily basis.

TECHNICAL SUPPORT

The company offers a dedicated technical support via telephone and an email address. It will also accept faxed support queries.

Technical support will be given free of charge for 90 days from the date of invoice, for queries regarding the use of the products in the system configuration for which they were sold. Features not documented in the user manual or a written offer of the company will not be supported. Interfacing with other products other than those that are pre-approved by the company as compatible will not be supported. If the development tools and system hardware is demonstrably working, no support can be given with application level problems.

WARRANTY

The company offers as part of a purchase contract 12 months warranty against parts and defective workmanship of hardware elements of a system. The basis of this warranty is that the fault be discussed with the companies technical support staff before any return is made. If it is agreed that a return for repair is necessary then the faulty item and any other component of the system as requested by those staff shall be returned carriage paid to the company. Insurance terms as discussed in the INSURANCE Section will apply.

Returned goods will not be accepted by the company unless this has been expressly authorised.

After warranty repair, goods will be returned to the buyer carriage paid by the company using their preferred method.

Faults incurred by abuse of the product (as defined by the company) are not covered by the warranty.

Attempted repair or alteration of the goods as supplied by the company, by another party immediately invalidates the warranty offered.

The said warranty is contingent upon the proper use of the goods by the customer and does not cover any part of the goods which has been modified without Nallatech's prior written consent or which has been subjected to unusual physical or electrical stress or on which the original

identification marks have been removed or altered. Nor will such warranty apply if repair or parts required as a result of causes other than ordinary authorised use including without limitation accident, air conditioning, humidity control or other environmental conditions.

Under no circumstances will the company be liable for any incidental or consequential damage or expense of any kind, including, but not limited to, personal injuries and loss of profits arising in connection with any contract or with the use, abuse, unsafe use or inability to use the companies goods. The company's maximum liability shall not exceed and the customer's remedy is limited to, either:

(i)   repair or replacement of the defective part or product or at the companies option;

(ii)   return of the product and refund of the purchase price and such remedy shall be the customers entire and exclusive remedy.

Warranty of the software written by the company shall be limited to 90 days warranty that the media is free from defects and no warranty express or implied is given that the computer software will be free from error or will meet the specification requirements of the buyer.

The terms of any warranty offered by a third party whose software is supplied by the company will be honoured by the company exactly. No other warranty is offered by the company on these products.

Return of faulty equipment after the warranty period has expired, the company may at its discretion make a quotation for repair of the equipment or declare that the equipment is beyond repair.

PASSING OF RISK AND TITLE

The passing of risk for any supply made by the company shall occur at the time of delivery. The title however shall not pass to the buyer until payment has been received in full by the company. And no other sums whatever shall be due from the customer to Nallatech.

If the customer (who shall in such case act on his own account and not as agent for Nallatech) shall sell the goods prior to making payment in full for them, the beneficial entitlement of Nallatech therein shall attach to the proceeds of such sale or to the claim for such proceeds.

The customer shall store any goods owned by Nallatech in such a way that they are clearly identifiable as Nallatech's property and shall maintain records of them identifying them as Nallatech's property. The customer will allow Nallatech to inspect these records and the goods themselves upon request.

In the event of failure by the customer to pay any part of the price of the goods, in addition to any other remedies available to Nallatech under these terms and conditions or otherwise, Nallatech shall be entitled to repossess the goods. The customer will assist and allow Nallatech to repossess the goods as aforesaid and for this purpose admit or procure the admission of Nallatech or its employees and agents to the premises in which the goods are situated.

INTELLECTUAL PROPERTY

The buyer agrees to preserve the Intellectual Property Rights (IPR) of the company at all times and that no contract for supply of goods involves loss of IPR by the company unless expressly offered as part of the contract by the company.

GOVERNING LAW

This agreement and performance of both parties shall be governed by Scottish law.

Any disputes under any contract entered into by the company shall be settled in a court if the company's choice operating under Scottish law and the buyer agrees to attend any such proceedings. No action can be brought arising out of any contract more than 12 months after the completion of the contract.

INDEMNITY

The buyer shall indemnify the company against all claims made against the company by a third party in respect of the goods supplied by the company.

SEVERABILITY

If any part of these terms and conditions is found to be illegal, void or unenforceable for any reason, then such clause or Section shall be severable from the remaining clauses and Sections of these terms and conditions which shall remain in force.

NOTICES

Any notice to be given hereunder shall be in writing and shall be deemed to have been duly given if sent or delivered to the party concerned at its address specified on the invoice or such other addresses as that party may from time to time notify in writing and shall be deemed to have been served, if sent by post, 48 hours after posting.

Licensing Agreement

Nallatech Ltd software is licensed for use by end users under the following conditions. By installing the software you agree to be bound by the terms of this license. If you do not agree with the terms of this license, do not install the Software and promptly return it to the place where you obtained it.:

1.   **Licence:** Nallatech Ltd grants you a licence to use the software programs and documentation in this package("Licensed materials") if you have a single license, on only one computer at a time *or* by only one user at a time;

if you have acquired multiple licenses, the Software may be used on either stand alone computers or on computer networks, by a number of simultaneous users equal to or less than the number of licenses that you have acquired; and, if you maintain the confidentiality of the Software and documentation at all times.

2.   **Restrictions:** This software contains trade secrets in its human perceivable form and, to protect them, except as permitted by applicable law, you may not reverse engineer, disassemble or otherwise reduce the software to any human perceivable form. You may not modify, translate, rent, lease, loan or create derivative works based upon the software or part thereof without a specific run-time licence from Nallatech Ltd.

3.   **Copyright:** The Licensed Materials are Copyrighted. Accordingly, you may either make one copy of the Licensed Materials for backup and/or archival purposes or copy the Licensed Materials to another medium and keep the original Licensed Materials for backup and/or archival purposes. Additionally, if the package contains multiple versions of the Licensed Materials, then you may only use the Licensed Materials in one version on a single computer. In no event may you use two copies of the Licensed Materials at the same time.

4.   **Warranty:** Nallatech Ltd warrants the media to be free from defects in material and workmanship and that the software will substantially conform to the related documentation for a period of ninety (90) days after the date of your purchase. Nallatech Ltd does not warrant that the Licensed Materials will be free from error or will meet your specific requirements.

5.   **Limitations:** Nallatech Ltd makes no warranty or condition, either expressed or implied, including but not limited to any implied warranties of merchantability and fitness for a particular purpose, regarding the Licensed Materials.

Neither Nallatech Ltd nor any applicable Licenser will be liable for any incidental or consequential damages, including but not limited to lost profits.

6.   **Export Control:** The Software is subject to the export control laws of the United States and of the United Kingdom. The Software may not be shipped, transferred, or re-exported directly or indirectly into any country prohibited by the United States Export Administration Act 1969 as amended, and the regulations there under, or be used for any purpose prohibited by the Act.

User Guide Conditions

Information in this User Guide is subject to change without notice. Any changes will be included in future versions of this document. Information within this manual may include technical, typing or printing inaccuracies or errors and no liability will arise therefrom.

This User Guide is supplied without warranty or condition, either expressed or implied, including but not limited to any implied warranties of merchantability and fitness for a particular purpose, regarding the information provided herein.

Under no circumstances will Nallatech Limited be liable for any incidental or consequential damage or expense of any kind, including, but not limited to, loss of profits, arising in connection with the use of the information provided herein.

Index

Remarks form

We welcome any comments you may have on our product and its documentation. Your remarks will be examined thoroughly and taken into account for future versions of this product.

FUSE System Software User Guide NT107-0068V2 3	23/09/2002

Errors detected:

Suggested Improvements:

Please send this completed form to:

Nallatech
Boolean House
One Napier Park
Cumbernauld
Glasgow G68 0BH
United Kingdom

If you prefer you may send your remarks via E-mail to support@nallatech.com or by fax to +44 (0) 1236 789599.

If you want Nallatech to reply to your comments, please include your name, address and telephone number.